WHAT IS CLAIMED IS:

2 comprises a selectable marker.

1	1. A eukaryotic cell that comprises a prokaryotic recombinase polypeptide			
2	or a nucleic acid that encodes a prokaryotic recombinase, wherein the recombinase can			
3	mediate site-specific recombination between a first recombination site and a second			
4	recombination site that can serve as a substrate for recombination with the first			
5	recombination site, but in the absence of an additional factor that is not present in the			
6	eukaryotic cell cannot mediate recombination between two hybrid recombinase			
7	recombination sites that are formed upon recombination between the first recombination site			
8	and the second recombination site.			
1	2. The eukaryotic cell of claim 1, wherein the recombinase is selected			
2	from the group consisting of a bacteriophage ΦC31 integrase, a coliphage P4 recombinase, a			
3	Listeria phage recombinase, a bacteriophage R4 Sre recombinase, a CisA recombinase, an			
4	XisF recombinase, and a transposon Tn4451 TnpX recombinase.			
1	3. The eukaryotic cell of claim 1, wherein the recombinase is a			
2	bacteriophage ΦC31 integrase.			
1	4. The eukaryotic cell of claim 1, wherein the first recombination site is an			
2	attB site and the second recombination site is an attP site.			
1	5. The eukaryotic cell of claim 1, wherein the cell further comprises a first			
2	recombinase recombination site.			
1	6. The eukaryotic cell of claim 1, wherein the cell comprises a nucleic acid			
2	that comprises a coding sequence for an recombinase polypeptide, which coding sequence is			
3	operably linked to a promoter that mediates expression of the recombinase-encoding			
4	polynucleotide in the eukaryotic cell.			
1	7. The eukaryotic cell of claim 6, wherein the nucleic acid further			

1	8	•	The eukaryotic cell of claim 6, wherein the promoter is an inducible or a		
2	repressible promoter.				
1	9	•	The eukaryotic cell of claim 8, wherein the nucleic acid is the plasmid		
2	pLT43.				
1	1	0.	The eukaryotic cell of claim 1, wherein the eukaryotic cell is selected		
			sisting of an animal cell, a plant cell, a yeast cell, an insect cell and a		
2		JOHS	issing of an animal cent, a plant cent, a yeast cent, an insect cent and a		
3	fungal cell.		•		
1	1	1.	The eukaryotic cell of claim 10, wherein the eukaryotic cell is a		
2	mammalian cell	•			
1	1	2.	The eukaryotic cell of claim 10, wherein the eukaryotic cell is present in		
1					
2	a multicellular o	nga	IIISIII.		
1	. 1	3.	A method for obtaining site-specific recombination in a eukaryotic cell,		
2	the method comprising:				
3			providing a eukaryotic cell that comprises a first recombination site and		
4	a second recombination site, which second recombination site can serve as a substrate for				
5	recombination with the first recombination site;				
6			contacting the first and the second recombination sites with a		
7	prokaryotic recombinase polypeptide, resulting in recombination between the recombination				
8	sites, thereby forming one or two hybrid recombination sites;				
9			wherein the recombinase polypeptide can mediate site-specific		
10	recombination between the first and second recombination sites, but cannot mediate				
11	recombination between two hybrid recombination sites in the absence of an additional factor				
12	that is not present in the eukaryotic cell.				
1]	14.	The method of claim 13, wherein the eukaryotic cell is selected from the		

group consisting of a yeast cell, a fungal cell, a plant cell, an insect cell and an animal cell.

15. The method of claim 13, wherein the first recombination site is present 1 in a chromosome of the eukaryotic cell. 2 The method of claim 15, wherein the second recombination site is 1 present in a second chromosome of the eukaryotic cell and contacting the first and second 2 recombination sites with the recombinase results in translocation of chromosome arms. 3 The method of claim 13, wherein the first recombination site and the 1 17. second recombination site are present on a single nucleic acid molecule. 2 The method of claim 17, wherein the first recombination site and the 1 second recombination site are in a direct orientation. 2 The method of claim 18, wherein the recombination results in excision 1 of the portion of the nucleic acid molecule that lies between the first and second 2 recombination sites. 3 The method of claim 17, wherein the first recombination site and the 1 second recombination site are in an inverted orientation. 2 21. The method of claim 20, wherein the recombination results in inversion 1 2 of the portion of the nucleic acid molecule that lies between the first and second recombination sites. 3 The method of claim 13, wherein the eukaryotic cell comprises a 1 polynucleotide that encodes the recombinase polypeptide. 2 The method of claim 22, wherein the recombinase-encoding 23. 1 polynucleotide is operably linked to a promoter which mediates expression of the 2

3

polynucleotide in the eukaryotic cell.

1	24. The method of claim 23, wherein the promoter is an inductore or a			
2	repressible promoter.			
1	25. The method of claim 24, wherein the promoter is a <i>Pmnt</i> promoter.			
1	26. A method for obtaining a eukaryotic cell having a stably integrated			
2	transgene, the method comprising:			
3	introducing a nucleic acid into a eukaryotic cell that comprises a first			
4	recombination site, wherein the nucleic acid comprises a transgene and a second			
5	recombination site which can serve as a substrate for recombination with the first			
6	recombination site; and			
7	contacting the first and the second recombination sites with a			
8	prokaryotic recombinase polypeptide, wherein the recombinase polypeptide catalyzes			
9	recombination between the first and second recombination sites, resulting in integration of			
10	the nucleic acid at the first recombination site, thereby forming a hybrid recombination site			
11	at each end of the nucleic acid;			
12	wherein the recombinase polypeptide can mediate site-specific			
13	recombination between the first and second recombination sites, but cannot mediate			
14	recombination between two hybrid recombination sites in the absence of an additional factor			
15	that is not present in the eukaryotic cell.			
1	27. The method of claim 26, wherein the recombinase polypeptide is			
2	selected from the group consisting of a bacteriophage ΦC31 integrase, a coliphage P4			
3	recombinase, a Listeria phage recombinase, a bacteriophage R4 Sre recombinase, a CisA			
4	recombinase, an XisF recombinase, and a transposon Tn4451 TnpX recombinase.			
1	28. The method of claim 27, wherein the recombinase is a ΦC31 integrase.			
1	29. The method of claim 26, wherein the recombinase polypeptide is			
2	introduced into the eukaryotic cell by expression of a polynucleotide that encodes the			
3	recombinase polypeptide.			

The method of claim 29, wherein the polynucleotide that encodes the 1 recombinase polypeptide is operably linked to a promoter that functions in the eukaryotic 2 3 cell. The method of claim 30, wherein the promoter is an inducible or a 1 2 repressible promoter. 32. A nucleic acid that comprises a polynucleotide sequence that encodes a 1 bacterial recombinase polypeptide operably linked to a promoter that functions in a 2 eukaryotic cell, wherein the recombinase polypeptide cannot mediate recombination between 3 two hybrid recombination sites that are formed upon recombination between a first 4 recombination site and a second recombination site in the absence of an additional factor. 5 33. The nucleic acid of claim 32, wherein the nucleic acid further comprises 1 at least one recombination site that is recognized by the recombinase polypeptide. 2 The nucleic acid of claim 32, wherein the nucleic acid comprises a 1 2 plasmid vector. The nucleic acid of claim 34, wherein the vector is pLT43. 35. 1 A eukaryotic cell that comprises a polynucleotide that comprises a first 1 bacteriophage Φ C31 recombination site. 2 The eukaryotic cell of claim 36, wherein the recombination site is 1 selected from the group consisting of attP and attB. 2 The eukaryotic cell of claim 36, wherein the eukaryotic cell further 1 comprises a second polynucleotide that comprises a second Φ C31 recombination site that 2 undergoes recombination with the first Φ C31 recombination site when contacted with a 3 ΦC31 integrase polypeptide. 4

1	39.	The eukaryotic cell of claim 38, wherein:		
2		the first recombination site is attB and the second recombination site is		
3	attP; or			
4		the first recombination site is attP and the second recombination site is		
5	attB.			
1	40.	The eukaryotic cell of claim 38, wherein the second polynucleotide		
2	further comprises	a transgene.		
1	41.	The eukaryotic cell of claim 38, wherein the second polynucleotide		
1 2		a selectable marker.		
2	Turther comprises	1 Sciectable marker.		
1	42.	The eukaryotic cell of claim 36, wherein the eukaryotic cell further		
2	comprises a ΦC31 integrase polypeptide.			
	-			
1	43.	The eukaryotic cell of claim 36, wherein the eukaryotic cell further		
2	comprises a nuclei	c acid that comprises a polynucleotide that encodes a ΦC31 integrase		
3	polypeptide.			
1	44.	The eukaryotic cell of claim 43, wherein the nucleic acid further		
2	comprises a selectable marker.			
1	45.	The eukaryotic cell of claim 43, wherein the nucleic acid further		
2		-		
3	comprises a promoter which results in expression of the Φ C31 integrase-encoding polynucleotide in the cell.			
3	polyndeleotide in	the cen.		
1	46.	The eukaryotic cell of claim 45, wherein the promoter is an inducible		
2	promoter.			
	-			
1	47.	The eukaryotic cell of claim 36, wherein the eukaryotic cell is selected		
2	from the group consisting of a yeast cell, a fungal cell, a plant cell, and an animal cell.			